Sex Characters of the Pupae of the Banded Moth, *Cochylis hospes* Walsingham (Lepidoptera: Cochylidae)

The banded sunflower moth *Cochylis hospes* Walsingham, is a destructive pest of commercial sunflower seed (Charlet and Busacca 1986, Charlet L. D. and J. D. Busacca. 1986. Insecticidal Control of Banded Sunflower Moth, *Cochylis hospes* (Lepidoptera: Cochylidae), Larvae at Different Sunflower Growth Stages and Dates of Planting in North Dakota. J. Econ. Entomol. 79:648-650. Beregovoy, personal communication). Increased cultivation of the sunflower and economic loss due to banded sunflower moth damage has led to research into the biology and control of this species. A description of sex characters useful in sexing the pupae has not been published. Sexing the pupae is useful for behavioral or physiological research where adults must be kept separate. The genital primordia and the length or diameter of the antennae have been used to sex pupae of the sunflower moth *Homoeosoma electellum* Hulst (Rogers C. E. 1978. Sexing pupae and adults of the sunflower moth. S. W. Entomol. 3:305-307). These morphological characters were examined in the banded sunflower moth to determine their usefulness in sexing pupae.

Pupae were obtained from a laboratory culture of *C. hospes* established at the Metabolism and Radiation Research Laboratory, Fargo, North Dakota. A

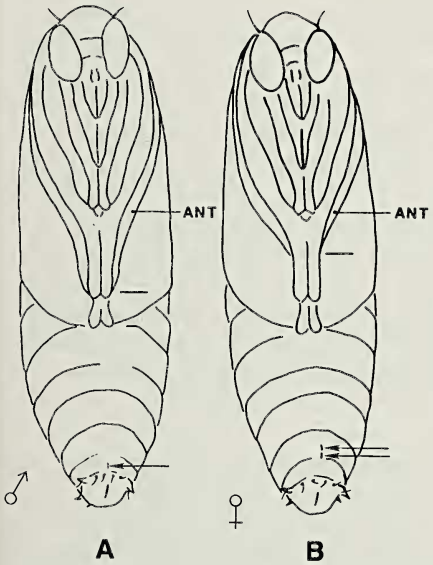

Fig. 1. Ventral view of *C. hospes* pupae showing sex characters Arrows show genital primorida. Solid lines indicate posterior limit of antennae. Ant = antenna

The genital primordia and length of the antennae are useful in sexing the pupae of *C. hospes*. The genital opening of the male pupae is a single opening on the 9th abdominal sternite (Fig. 1A). The genital opening of the female is on the 8th abdominal sternite. The female genital opening is longer than in the male and appears divided into two openings (Fig. 1B). The developing antennae extend to the margin separating the 2nd and 3rd abdominal sternites in females. In males, the antennae extend to the margin separating the 3rd and 4th abdominal segments (Fig. 1).

The genital primoridia are conclusive morphological features to identify the sex of *C. hospes* pupae. The lengths of the developing antennae are reliable sex characters, but experience is required to use this character. In the authors experience, these morphological features were 100% reliable.

dissecting microscope at 20X was used to examine 50 pupae. Conformation of sex in relation to morphology was determined by dissection of the pupa for testes and ovaries.

Reliable methods to sex *C. hospes* pupae should be useful in research on the behavior and biology of this important pest species.

Acknowledgements. The assistance of Kelly Jones and Sharon Grugel in rearing *C. hospes* in the laboratory is acknowledged.

John F. Barker, United States Department of Agriculture, Metabolism and Radiation Research Laboratory, P.O.B. 5674, Fargo, ND 58105

Laboratory Rearing of *Sandia xami xami* (Lycaenidae, Eumaeini).

The population dynamics of *Sandia xami* in a small volcanic area near Mexico City has been studied since 1984. The high numbers of eggs required to perform life-table experiments lead us to attemp the rearing of *S. xami* in laboratory conditions.

S. xami flies from central México to the southern part of Texas and Arizona (Scott, J.A. 1986. *The butterflies of North America.* Stanford University press. Stanford, California. 583 pp.). In the Valley of Mexico *S. xami* can be found all year with peaks of abundance in August-October, January-March and, perhaps, April and May (Soberón, J., C. Cordero, B. Benrey, P. Parlange, C. Garcia-Saez and G. Berges. 1988. *Ecol. Entom. 13(1)*: 71-76.). *S. xami* feeds on several Crassulaceae species (Ziegler, J.B. and T. Escalante. 1964. *Jour. Lep. Soc. 18*: 85-89) but in the ecological reserve on the National University of Mexico Campus at Mexico City, the main food plant is *Echeveria gibbiflora.* The larvae eats the leaves, flowers and stem of the plant. *S. xami* may be regarded as a leaf-miner on the exceptionally thick leaves of *Echeveria.* The life cycle was partially described by Ziegler and Escalante (*op. cit.*). The territorial behavior of *S. xami* has been described by Cordero (1986. Defensa territorial en la mariposa *Sandia xami.* B. Sc. Thesis. Fac. de Ciencias. UNAM. 75 pp.) and Cordero and Soberón (submitted) and their oviposition patterns by Soberón *et al* (*op. cit.*).

Early Stages

To obtain the eggs in the laboratory, a fertilized female is placed in a cage (fig. 1) built according to Munger, F. and T.T. Harris (1970. *Jour. Res. Lep. 8*: 169-176.). A 100 watts tungsten lamp is placed over the insectary a providing a 8:16 LD. One or two pots with *Echeveria* are placed inside the insectary. The females lay most eggs on the surface of the plant, although it is not uncommon to find eggs on the pot. A single female can produce up to 200 eggs in a three week period (fig. 2). Peak egg-laying takes place in the first week.

Every morning eggs are removed using a fine camel hair brush slightly dampened with tap water. The eggs are then placed in square (1.5 cm side) cuts of *Echeveria* leaves over a filter paper and inside plastic Petri dishes.

Larvae that have emerged from eggs are fed with squares of *Echeveria* which are replaced as required. The humidity inside the Petri dishes is kept high by a drop of water every three days. The Petri dishes are kept at room temperature. A single, medium-sized leaf (10 cm long) provides food for one larvae to mature.

Larvae are handled with fine camel hair brushes during the first two instars.